1ST YEAR – FALL SEMESTER

JDF105 Introduction to Engineering (2-0)-5

General concepts definition and historical background of engineering. The general concept and definition of surveying engineering. History of national mapping and geodetical studies in Turkey. Historical development of surveying engineering education in Turkey. National foundations related with surveying engineering and their functions the national and international professional foundations and their function.

JDF113 Use of Basic Computer Techniques (1-2)-4

Introduction to computer technology (Definition, historical development, types of computers, computer hardware (motherboard, processor, memory, hard disk, video card, sound card, network card, modem, cd/dvd drive/writer, floppy disk, keyboard, mouse, monitor, speakers, microphone, printer, scanner, plotter)), Software (software types, operating systems, application software, programming languages), Operating systems, Windows 2000 operating system, Office programs and applications, word processors (Microsoft Word, and applications), data and graphics processors (Microsoft Excel, and applications)

JDF115 Surveying I (2-2)-6


MAT181 Mathematics I (4-0)-6


FİZ181 Physics I (3-0)-4

Physics and measurement, motion in one dimension, vectors, motion in two dimensions, the laws of motion, circular motion and other applications of Newton’s laws, work and kinetic energy, potential energy and conservation of energy, linear momentum
and collisions, rotation of a grid body around a fixed axis, Rolling motion and angular momentum, static equilibrum and its properties.

FİZ191 Physics Laboratory I (0-3)-1


1ST YEAR – SPRING SEMESTER

JDF120 Surveying II (3-2)-7

Principles of traversing, reconnaissance surveys, construction of permanent stations, monumenting, booking and recording surveys. Types of traverses and traverse computations. Intersection and resection surveys and computations. Free station computation. Linear (Helmert) transformation of coordinates. Principles of electromagnetic distance measurement and electromagnetic wave propagation. Systematic and random errors in electromagnetic distance measurements. Reduction of electromagnetically measured distances to reference surfaces (geoid and ellipsoid surfaces) and corrections to the distance measurements. Checking and calibrating electromagnetic distance measurement instruments. Designing, surveying, constructing and computation of a calibration baseline.

JDF122 Computer Programming (2-2)-8

Concept of the programming, development of the programming language. Programming languages. Programming aplications of the professional problems.

MAT182 Mathematics II (4-0)-6


FİZ182 Physics II (3-0)-4


FİZ 192 Physics Laboratory II (0-3)-1

2ND YEAR – FALL SEMESTER

JDF209 Numerical Analysis (3-0)-4


JDF217 Height Measurements (1-2)-4

Heights, geoid and other physical height concepts, heighting systems and scientific heights. Methods of determining of heights: Geometric, trigonometric and barometric levellings, modern and classical equipments in levelling, errors in surveying and precision, determining effects of refraction and spherical lines of sight. Tachymetry, postprocessing and plotting in tachymetry. Surface levelling, surveying of alignments and cross sections of roads, postprocessing and plotting in surface levelling. Surveying techniques of measuring heights of buildings.

JDF219 Cartography (2-2)-6

Definition of Cartography; Map concept and classification of maps; Map scale and scale representation; Plot description and segmentation; Map bases; Drawing tools and supplies; Custom Signs; Map writings and standards; Map data drawing standards; Heights on the map display methods; Reduction and generalization of the maps; Maps replication techniques; Thematic map making principles; Computer-aided mapping principles; Map use and the measurement and calculations on the map; Applications for the drawing of the map. The concept and classification of map projection, Shape and dimensions of the earth, Earth's surface for about definition and usage limits of these surfaces, Geographical and global polar coordinate systems, Special curves and areas defined on the earth definition, related to these basic relations. Deformations of the mathematical principles of map projection. Cone, plane, cylindrical and other types of projection. Issues related to numerical applications.

JDF223 Probability and Statistics (2-0)-3


JDF225 Realty Laws (2-0)-3


MAT281 Mathematics III (3-0)-4

Definition, types and classification of differential equations. Solution concept. General, special and singular solutions of differential equations. 1st degree differential

2ND YEAR – SPRING SEMESTER

JDF220 Summer Practice I (0-0)-4

Course is done in accordance with the regulation by students in order to improve and apply their occupational knowledge and experience which they gain until this semester and perceive the implementations and method differences which are carried on by various corporations.

JDF232 Computer Aided Design (2-2)-3

Mathematical foundations of computer graphics, coordinate systems, 3 and 2-dimensional transformations, point, line and areal objects, various CAD and mapping software and their applications, structure of the graphics formats and conversions between formats, LISP programming.

JDF234 Field Work I (0-4)-4

Establishment of polygon in the field, survey and computation, prismatic and tacheometric survey, plot in office environment.

JDF242 Geodetic Surveys (1-2)-2


JDF244 Cadastral Foundations (3-0)-3


JDF246 Engineering Ethics (1-0)-1

Emphasizing of universal and individual ethic rules, the knowledge about the universal ethic principles, learning of engineering ethic rules and on this base the research, investigation and evaluation of problems about work diciplines,
MAT282 Mathematics IV (3-0)-5


3RD YEAR – FALL SEMESTER

JDF327 Adjustment I (3-0)-4


JDF329 Photogrammetry I (2-2)-4

Contains, definitions, historical development, application sides, classification of photogrametry. Photogrammetrical foundations, optical foundations, geometrical foundations, Photographical foundations, Monoscopy stereoscopic and its mathematical investigation, stereoscopy, parallax, and parallax survey. 3D/stereoscopic view. Introduction to aerial photos.

JDF333 Database Management Systems (3-0)-4

Database and base concepts, Database management systems and models; hierarchical model, network model, relational model, object-based model and sample applications, Assets from the association techniques. Graphic non-data search and query techniques. The concept of object-orientation and object-oriented database, Sample applications. The database and object-oriented database software and applications.

JDF335 Global Navi. Satellite Sys. (GNSS) (2-2)-4

GNSS segments, principles of GNSS. GNSS signals and signal processing. GPS observations and observables, data formats (RINEX). GPS measuring and positioning techniques. Planning, observing and evaluating GPS measurements. Coordinate systems used in GPS: Earth-centered earth-fixed coordinate system and inertial coordinate system. World Geodetic System-1984 (WEGS84). Local coordinate systems. Transformations between coordinate systems.

JDF337 Geodesy I (2-0)-3

**Vocational Elective I Courses:**

JDF345 Basic Image Information (2-0)-4

- Optics, microwave and laser imaging, 2D-3D image, image coordinate systems, 3D imaging/display techniques.

JDF347 Surveying Applications for Local Governments (2-0)-4

- Municipalities. Municipal Law No. 5272, distributed authority and responsibility local authorities, judgement bodies and duties, determined and become final municipal border, prepared strategic and performance plans, determined urban transformation and development areas, planning current maps, zone plans implementations, legislation and application relations.

JDF349 Cadastral Data and Applications (2-0)-4

- City and outside, inside or outside of the contiguous area, places with or without the development plan, cadastral registration in the fields after the fields and villages built-in applications subject to change depending on demand operations (allotment, allotment, leaving the road, the road established, et al.) the initial stage up to the stage of the process of registration as a practical expression of and project work make for it.

JDF351 Mine Surveying (2-0)-4

- Scopes of mine surveying are; getting mine rights, mine surveying services in steps of mine searching, reserve evaluation and preparing project. Definition about geological knowledge, measurement, calculation and graphical showings which given in maps and plans; measurement, map and plan services in open pit and underground mine projects appliance and management; mine plans and relevant arrangements. Slope stability observations and processing in open pits, mine subsidences measurement and calculation.

JDF353 Infrastructure Cadastre (2-0)-4

- The scope and historical development of Infrastructure cadastre. Issue of infrastructure facilities registered in a cadastre. the legal and administrative arrangements related to Cadastral infrastructure. Infrastructure cadastre stages. surveying and mapping work related to Seen and unseen infrastructure lie and facilities. Infrastructure kadastosunda automation.

JDF355 Urban and Regional Planning (2-0)-4

- Introduction. Historical development. Basic components. Settling, progression of the settling. Explaining of the urban construction since the old period, areas of the basic function areas and its intensity. Plans for the developments, constituting of the development parcels, arrangement of the development. Effects of the arrival, cases of the becoming a center, types of the urbans. Contemporary planning. Basic features and criterions at planning of the urban and the region.
JDF357 Cartographic Map Production (2-0)-4

Cartographic Expression and Design Theory, Map Compilation, Generalization, Marketing, cartography ergonomics.

JDF359 Geodetic Astronomy (2-0)-4


JDF361 Equipment Handling (2-0)-4


JDF363 Error Theory and Estimation (2-0)-4

Geodetic surveys, observation errors and probability theories and relationship between them. Hope value, variance, covariance, correlation and normal distribution concepts. Accuracy and precision criteria, cofactor and weight concepts. Error propagation laws. Parameter estimation. Linear models for parameter estimation. Least squares method, application of this method to direct and indirect observations.

3RD YEAR – SPRING SEMESTER

JDF314 Adjustment II (3-0)-3


JDF320 Summer Practice II (0-0)-4

Course is done in accordance with the regulation by students in order to improve and apply their occupational knowledge and experience which they gain until this semester and perceive the implementations and method differences which are carried on by various corporations.

JDF332 Geodesy II (3-0)-3


JDF334 Geographical Information Systems (2-2)-3

The concept of GIS, history, application areas and purposes. GIS and map, The importance of the map in GIS, used map types and model theories. GIS functions, components, data sources, hardware and software features. data types in GIS. Techniques of acquiring data, storage methods, numerical applications. Fundamental and mathematical approaches to recognize the shape of raster images. The concept of topology in GIS, topological operations, Sample applications. Generalization and generalization algorithms in GIS. data standards in GIS. Location-based analysis in GIS.

JDF336 Photogrammetry II (2-1)-2


JDF338 Digital Image Processing (2-0)-2

Introduction, contents, basic terms, references, principles of digital image, image geometry, image digitization, resampling, characteristics of digital image, elements of visual perception, data structures in image processing, image pre-processing, pixel radiance transformations, geometric transformation, contrast enhancement, linear contrast enhancement, image thresholding, histogram, gray-value histogram, non-linear enhancement (histogram thresholding), spatial enhancement, spatial filtering, noise removal, image enhancement in frequency domain, low-pass filters, high-pass filters, morphological algorithms in image processing, image segmentation, geometric transformations, image classification, object display and recognize.

Vocational Elective II Courses:

JDF342 Rural Land Evaluation (2-0)-5

Fundamental principles in Rural Land Arrangement, The methods of rural land arrangement, rural land arrangement and implementations in Turkey, implementations of rural land arrangement, land consolidation in rural land arrangement, surveying phases in land arrangement, surveying and interpretation, organization in rural land arrangement, General Technical and Juridical Problems of rural land arrangement, Conclusion and Suggestions.

JDF344 Coordinate Systems (2-0)-5

Celestial coordinate systems: Horizon coordinates system, hour angle coordinate system, right ascension coordinate system, ecliptic coordinate system. Terrestrial coordinate systems: Astronomical systems, geodetic (ellipsoidal) systems.

JDF348 Programming in Database Man. Sys. (2-0)-5

Data base and base concepts, Database management systems and models; hierarchical model, network model, relational model, object-based model and sample applications, Assets from the association techniques. Graphic non-data search and query techniques. The concept of object-orientation and object-oriented data base, Sample applications. The database and object-oriented database software and applications.

JDF350 Hydrographic Surveys (2-0)-5


JDF352 Cartographical Database Man. Sys. (2-0)-5

Cartographical DBMS presentation. Maps used in cartography and relations with the DBMS. Design and application of cartographic DBMS

JDF354 Underground Surveying Techniques (2-0)-5

The definition and theory of underground surveying. Applications and projections of measurement techniques in the underground. Methods of special geodetic measurements in the underground. Introduction of underground surveying techniques in the world

JDF356 Photogrammetric Project Management (2-0)-5

Definition of Photogrammetric Project; planning and actualization of the projects, exercise, control, supervision and management of actualization of the projects. Map projects and management of them. Expectations from projects and drafting technical specifications. Using new techniques in projects.

4TH YEAR – FALL SEMESTER

JDF427 Land Management (2-2)-4

Introduction to Land Management. The concept of Property. The concept of Sustainable Land Management. Local authorities and their duties. Revision of large scale topographic maps. Kinds of plans, environmental, regional and zoning. Kinds of zoning

JDF437 Public Surveys (1-2)-3

Engineering projects which includes land and Surveying Engineering Services in these projects feasibility, designing, appliance and administration; Knowledge and documents about project and tender file; Horizontal, vertical, location, section and dimension applications about projects; Measurements and calculations about income and final accounts. Special measurement equipments and systems which use in project surveying.

JDF439 Remote Sensing (2-1)-3

Description, function, fields of application, classification and history of Remote Sensing. Electromagnetic energy, Electromagnetic spectrum, effect of atmosphere, interaction with the surface mass, spectral reflection, attitude of the mass in microwave area, optical sensors, microwave sensors, optical-mechanical scanners, digital image, record formats of data, resolution, natural and artificial colored images, 3D vision, images with distortion, thermal images, image enrichment, filtration, introduction to classification, pixel-based classification, object-based classification, accuracy of classification, 3D satellite images, orthorectification, using of satellite images in geographical information system

JDF463 Academic Writing & Presentation (2-0)-2


JDF441 Summer Practice (0-0)-2

Course is done in accordance with the regulation by students in order to improve and apply their occupational knowledge and experience which they gain until this semester and perceive the implementations and method differences which are carried on by various corporations.

JDF499 Dissertation Study (0-6)-5

A study which includes a subject on vocational research and application will be performed.
**Vocational Elective III Courses:**

JDF433 Physical Geodesy (3-0)-5


JDF443 Realty Valuation (3-0)-5

Concepts of value and real value. Urban and rural real estate assessment. To evaluate the parameters affecting the and the relationships between them. In terms of immovable legislation and the expropriation property assessment. Real estate evaluation methods. Statistical analysis for the assessment of immovable Anketsel basis.

JDF451 Land Info Systems (3-0)-5


JDF459 GNSS Applications (3-0)-5

GPS surveys. GPS surveying and positioning techniques and their types. GPS observations and observables, data formats. Planning field work and evaluating observations.

JDF465 Expropriation (3-0)-5


JDF467 Forestal Cadastre (3-0)-5

The Importance of Forestry and Forest cadastre, Definition of Forest and Terms of forest legislation. Implementation of Forest Cadastral Maps.

JDF469 Digital Photogrammetry (3-0)-5

Definition of digital photogrammetry, digital photogrammetric processing techniques, analog and digital cameras, digital data acquisition techniques, high-precision scanners and video digitizers, raster and vector scanning techniques, digital image resolution criterions, digital image types, digital image matching techniques, digital image tracking methods.

JDF471 Photogrammetric Info Systems (3-0)-5

and symbology of photogrammetric data. Accuracy and application field. Usage of photogrammetric products in GIS.

JDF473 Laser Scanner Techniques (3-0)-5


JDF475 Photogrammetric Applications (3-0)-5

Introduction of photogrammetric applications, mathematical principals. Digital workstation, image processing softwares, Terrestrial photogrammetric applications. Mono and stereo orientation, 3D view applications and using in applications. 3D modelling applications. Image digitization, automatic feature extraction, photogrammetric data acquisition and evaluation via UAV.

JDF477 Geoid and Vertical Datum (3-0)-5


4TH YEAR – SPRING SEMESTER

JDF414 Dissertation Study (0-6)-5

A study which includes a subject on vocational research and application will be performed.

JDF430 Field Work II (0-4)-5

Establishing a triangulation network in a chosen region. Measuring all horizontal and vertical angles and distances in a triangle network, performing observation and computation controls and applying corrections to these measurements. Checking and calibrating all the instruments involved. Determining the heights of triangulation points by trigonometric leveling with the aid of all known heights in the vicinity of the network. Computing the orthometric height of appoint using precise leveling measurements and performing geodetic corrections to these. Presenting all the observations and computations in a thesis format.

JDF432 Road Management (2-1)-3

Historical development of highways in Turkey and in the world, classification of roads, terms about roads. Definitions and calculations about geometric elements of roads, vertical and horizontal arcs, transition curves. Design, design methods and design map. Making plans of roads horizontal and vertical positions and section geometries, cubic and Brückner calculation. Art buildings and planning basis. Road ground structure and planning. Application of road projects, excavation works.
Occupation of mapping-cadastrate, regulation and historical development of the sector, structure of the sector, publications, works and working areas of the sector. Municipality, pasture, mine, forest, nationalization, arrangement and analysing other regulation about content of land related with mapping-cadastrate and ownership. Project planning and applications of CPM-Pert diagrams.

**Vocational Elective IV Courses:**

JDF446 Urban Info Systems (3-0)-5

General definitions. Urban Information System (CIS) 's organizational planning. Categories contained in KBS: Planning, infrastructure, transport, environment, building permits and inspection, reconstruction, etc. data collection. Applications on CIS.

JDF460 Deformation Measurement (3-0)-5


JDF464 Zoning Applications (3-0)-5

Defining the urban or zoning plan and plan's variety, relations between environmental development and urbanization, investigating development in Turkish Civilization Law and comparison old and new law, effects of Zoning plan, land ownership and zoning plan implementation, generaly evaluation and suggestions about zoning plan implementation, how is Land readjustment done, how is calculated participation rate. Zoning Low 3194 and applications.

JDF468 Geospatial Applications in Remote Sensing (3-0)-5

Imaging and image geometry, coordinate transformation between image and ground coordinate systems, parametric and non-parametric transformation models, term of georeferencing accuracy, term of information content, orthoimage generation, DEM generation, vector data generation, 3D terrain model, data acquisition into GIS.

JDF470 Cartographical Info Systems (3-0)-5

Digitization, Scan, Editing Chart Data, Topological Functions based object, Topological Functions based layer, Geographic Raster Data Display, Vector-raster and raster-vector conversions, Planar Map Transformations, Digital Terrain Data Sampling Approaches, Grid Interpolation, Line Simplification Algorithms.

JDF472 Cadastral Info Systems (3-0)-5

JDF474 Zoning Apps. in Urban Areas (3-0)-5

Usage and development of urban areas in Turkey and in the world. Spoiled areas and historical structure relations in built up areas. Arrangement methods and legislation in built up areas. General criterias for choosing urban transformation arrangement areas. Preparing urban transformation projects. Duties of Geodesy and Photogrammetry engineer in urban transformation. Urban transformation applications in Turkey and interpretations.

JDF476 Microwave Sensing Systems (3-0)-5

Definition, history, systems and classification of microwave sensing. Microwave systems, technological development, professional importance. Basic and advanced microwave sensing systems, basic components and characteristics. Quality assessment of acquired data and contribution to map production.

JDF478 Digital Terrain Models (3-0)-5

Concept of Digital Terrain Models (DTM). Definitions and basic background. Fitting curves and surfaces. Regular and irregular DTM. Data structures in DTM, data formats. Establishing a DTM. Interpolation techniques used DTM. DTP applications. Analyses of perspective view of terrain, slope, exposure, visibility etc.

JDF480 Evaluation of Satellite Data (3-0)-5


JDF482 Satellite Geodesy (3-0)-5

Coordinate systems used in satellite geodesy: Earth-centered earth-fixed coordinate system and inertial coordinate system. World Geodetic System-1984 (WEGS84). Local coordinate systems. Transformation between coordinate systems. Time systems used in satellite geodesy. Kepllerian satellite orbits and their movements. GPS satellite orbits. Computation of satellite’s position and speed by broadcast and precise ephemerids.

JDF484 Geodetic Network Design (3-0)-5

Free Elective Course for Other Departments

JDF History of Surveying Science (2-0)-3

General information about historical improvement and emergence of mapping. Concept of mapping and the presentation of information and equations which were occurred around it. The scientists who supported the science history and the determination of their supports.

JDF Scientists in Surveying History (2-0)-3

Names and biographies of scientists who contributed to geodesy. Their scientific achievements and contributions to scientific community of geodesy in chronological order.

JDF Mining Subsidence and Problems Caused By (2-0)-3

Underground Mining causes ground movements (subsidence) in ground and surface. These subsidences create problems and damages natural and cultural structures which are within the domain. This formation and problems caused by Mining Subsidence will be covered in this course.

JDF Satellite Images and Usage Areas (2-0)-3

Remote Sensing Satellites and Images, History of development, Usage Areas, Visual Globe Applications (Google Earth, Nasa World Wind etc.) and Samples.